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Notes on the habits of certain species of MEXICAN HYMENOPTERA presented to the American Entomological Society,

BY FR. SUMICHRAST.

No. 1.

On the habits of the Mexican species of the genus Eciton,* *Latr.*

This genus, formed by the celebrated Latreille to receive certain American ants near to *Myrmica*, is represented in the hot and temperate parts of eastern Mexico by many species which are there known by the names of *tepeguas*, *hormigas*, *soldados* or *soldaderas*. The affinity which exists between them consists very much more in the analogy of their habits than in that of their forms. In fact, the generic character drawn from the excessively lengthened form of the mandibles cannot be found in all the species, and even among those where one observes it, it is the appendage of but one division of the workers. The antennæ, filiform in the majority of cases, become at other times, by the thickening of the flagellum, almost moniliform. The physiognomy of these insects is not more defined, some species (e. g. the No. 4 of my collection) recalling by their appearance *Myrmica*, while some others approach the type of *Oecodoma*. Finally, the system of coloration is far from being constant in the same species, and appears subject to certains variation of tint resulting from the difference of locality (e. g. Nos. 4 and 69—36 and 68 of my collection.)

We know as yet, it appears, only the neuter individuals or workers of *Eciton*. The males and females have escaped the researches of collectors, and it is probable, that, thanks to the care with which these insects conceal their nests from view in more solitary places, we shall only learn by chance, some day, about the winged sexes. I shall not be disinclined to believe, that, as Mr. Smith supposes (*Cat. Form. Brit. Mus.* p. 199), *Labidus* may be the male of *Eciton;* this conjecture seeming to me to be sustained by the fact that in Mexico it is in the season when the sorties of the *Eciton* are the more frequent that the *Labidus* also show themselves. These last, which one never sees during the day, show themselves in houses at evening in numbers, attracted by the light, at the time of the first rains, and their appearance generally coincides with the redoubled activity which one then remarks among the *tepeguas*.

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* The names of these species will be found at the end of this paper, with remarks by Edward Norton.

The most characteristic trait of the ants of this genus consists in the inroads or migrations which they undertake at undetermined epochs, but in relation, it appears to me, with the atmospheric changes. What traveller, passing over the *tierra caliente** has not encountered the phalanxes of *tepeguas* upon the paths of the primitive forests? What inhabitant of these countries has not, at least once, been unpleasantly torn from the arms of sleep by the invasion of his domicile by a black army of the *soldados?*

The purpose of these expeditions of *Eciton* is, without doubt, multiple, for the circumstance that these *sorties*, as one may call them, coincide more often with a change of season, hardly permits one to consider them exclusively as simple razzias undertaken at the expense of other insects. One can believe them to be sometimes expeditions of pillage, sometimes changes of domicile, veritable migrations. I believe that the following facts, which passed under my observation at the hacienda of Potrero, near Cordova, at the end of September of the past year, show proof of this. During about three months, a colony of *soldados* (No. 4) had been domiciled under a little bridge formed by some rough trunks of trees bound together by a heap of vegetable mould. The continual excavation which engaged the ants on the under side of the bridge, threatened to cause the disappearance of all the earth which covered the flooring. Every day I watched these labors in the hope of discovering at last the interior of the formicary, but this hope was disappointed, for on the 30th September, in the morning, I found the nest completely abandoned. Its inhabitants did not return until about four months later and this reappearance which was of short duration, was followed almost immediately by a visit which these insects made to my habitation, on the 12th of February, in the night. I have made similar observations in regard to another species (No. 36), and think I can conclude that the *Eciton*, at least the two species in question, are in the habit of forming temporary nests or habitations for themselves, which they abandon from time to time, distinct from those where are found the reproducing sexes, and where is the place of the growth of the larvæ and their metamorphoses.

The nests are found in cool and shady places in great woods or among rocks, and are tunneled more often at the foot of, and among, the roots of old trees. The earth, or the fragments of wood, which the ants cast out, sometimes forms a dome above, but at times only an irregular opening indicates the existence of a colony.*

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* Tropical region.

The extraction of one such nest, beside the difficulty of penetrating to the centre through the entangled roots of the tree, is not an easy thing, for at the first alarm, the *soldados* sally forth in myriads and attack the aggressor with fury.

Beside the changes of domicile, which are so generally in relation with the atmospheric variation as to serve as a rule to the inhabitants of the country, the *Eciton* devotes itself every season to excursions for pillage, destined to supply the larvæ with nourishment. Nothing is more curious than these *battues* executed by an entire population. Over an extent of many square metres, the soil literally disappears under the agglomeration of these little black bodies.† No apparent order reigns in the mass of the army, but behind this many lines or columns of laggards press on to rejoin it. The insects concealed under the dry leaves and the trunks of fallen trees, fly on all sides before this phalanx of pitiless hunters, but, blinded by their fright, they fall back among their persecutors and are seized and despatched in the twinkling of an eye. Grasshoppers, in spite of the advantage given them by their power of leaping, hardly escape any more easily. As soon as they are taken, the *Eciton* tears off the hinder feet and all resistance becomes useless.‡

If some heap of dry leaves, some tree or bush presents itself upon the path of the columns, a party of hunters separates itself from the mass of the army and, after having ransacked it in every part, retakes its place in the advanced guard. I have observed, sometimes, that little flies, of the family of Syrphides, follow, flying above them, the column of *Eciton*, but cannot give any account of the evolutions of these Diptera.

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* This refers to the habitations of the species No. 4 and 36, which are the only ones I have been able to meet.

† Yet referring to Nos. 4 and 36.

‡ Grasshoppers, spiders and roaches form the favorite game of the *tepeguas;* the larvæ of most species of little Blattides of the genus *Anaplecta*, the *Ischnoptera* &c., abound under the dry leaves in shady places and furnish them an easy prey.

It is probable that the *Eciton* attacks the larvæ and pupæ of other ants to make them serve as food for the nourishment of their own larvæ or for sustaining themselves. I surprised, one day, in the first hours of a sombre and rainy morning, a considerable assemblage of *tepeguas* (No. 36) fastened one upon another like a swarm of bees and entirely still. Having dispersed them I perceived in the place which they covered with their bodies a quantity of little white larvæ, brought away, doubtless, from the nests of some *Myrmicidæ*. At another time I witnessed the pillage of a *nursery* of other ants by a quite numerous band of Workers minores of No. 68; alarmed by the reprisals which I made on their account, they took to flight, some of them carrying between their mandibles as many as three larvæ at once. Among the Mexican species of the genus *Eciton*, that to which they apply more specially the name of *soldados* (No. 4), may be noticed for the habit which it has of invading the habitations of the country. These visits ordinarily take place at the beginning and the end of the rainy season, and almost always during the night. The expeditionary army penetrates the habitation which it proposes to visit at many points at once, and for this purpose divides itself into many columns of attack. One is apprised very soon of their arrival by the household commotion among the little parasitic animals. The rats (*Mus tectorum*), the spiders, the cockroaches (*Periplaneta australasiæ* Fab.), abandon their retreats and seek to escape from the attacks of the ants by flight. Alimentary substances the *soldados* hold in no esteem, and they disdain even sugary things, to which ants in general are so partial. Dead insects even do not seem to invite their covetousness. It has often happened to me to be obliged to abandon my abode, without having time to carry away my collection, to which they have never done the least injury. The trouble occasioned by these insects in entering houses is more than compensated by the expeditious manner in which they purge them of the vermin, and in this view their visit is an actual benefit.

The *Eciton* are found in all the hot and temperate parts of eastern Mexico; some species even climb quite high upon the declivity of the mountains, which are the foundations to the central plateau. Such is the case with Nos. 4, 39 and 40, which I have found at a height of nearly 4000 feet, in the environs of Orizaba. The localities where the heat and humidity encourage an abundant vegetation, are those which are sought for by the *tepeguas*, which seem to fear the rays of the sun and hazard themselves to bear their power only during the time necessary to traverse a clearing or a road.

No. 36 of my collection is quite common in the State of Vera Cruz, from the shore as far as the environs of Orizaba. It presents, among the neuters or workers which compose its societies, at least three categories of individuals; 1st, Those of great size (workers majores of Smith), having the head much enlarged and armed with mandibles, prolonged, slender and recurved into a hook: 2nd, Those of a size almost equal to the preceding, with little or no enlargement of the head, and the mandibles yet slender, but not also recurving toward the base. Among them, as in the first division, the head and the thorax are of a lighter color than the rest of the body. 3rd. The third category (workers minores of Smith) comprehends the individuals having the head and mandibles normally developed, and the color uniform. Among them the size is quite variable, they never attain to that of the two first divisions.

It is almost impossible to determine, with any certainty, the numerical proportion which each one of these three categories of workers bears in the colony; the following, based on a good number of observations, may give an approximate idea of it.

Workers majores, :: 5 : 100.
" intermedii :: 15 : 100.
" minores :: 80 : 100.

This determination is so much the less easy to establish, because there often comes a column of these *tepeguas*, only composed of individuals of the two last classes. This ordinarily takes place when it goes forth on a hunting expedition, in which the workers with long mandibles rarely take part.

A similar difficulty presents itself when one undertakes to divine the role of each one of these divisions of workers in the labors of the community. I incline to think that those of the first class (workers majores) use in the interior of the nest, for the labors of piercing the galleries, of clearing away, the instruments which the enormously developed head and mandibles furnish them. To these is reserved, without doubt, the guard of the formicarium during the expeditions undertaken by the two other classes. That which takes place in the societies of the *arriero* ant (*Oecodoma mexicana*) seems to me to favor this conjecture. Among these ants, in fact, the large sized workers having great heads provided with a single ocellus, do not quit the nest at all and do not go forth to the light, except when, troubled or alarmed by the introduction of a foreign body into the openings of their dwelling, they seek to satisfy themselves as to what is going on above.

The workers minores, (to return to the subject,) endowed with great activity and better formed for this end, are charged with the *razzias* destined to provide food for the larvæ, and perhaps they are guided in their course by the individuals of the second category which appear sometimes to rule by their movements the march of the column.

I have never seen the *tepeguas* transporting vegetable debris as do the *Oecodoma*, and it is to be presumed that the food of their larvæ is exclusively insectivorous. No doubt, also, they employ to garnish the interior of their nest, the fragments of wood from the tree which protects them, for they exhale a strong and nauseating odor like all the Formicidæ which live in decaying trunks.

No. 77 very closely resembles species No. 4, to which it seems to be allied by its form and habits.

It is distinguished from it by its light color, which is of a reddish-yellow, uniform in all parts; by the polished surface of the head of the workers majores; by the light color of the scape of the antennæ, &c. It is also more rare and more solitary in its habits. I have only found it at Potrero, in the great virgin forests which border the Rio Atoyac. Here also, I met No. 69, which is doubtless a brown variety of No. 4. This last, as well as No. 6, is of an irascible and nomadic character, and hunts also in disorderly masses. Nos. 39 and 40 have, on the contrary, quiet and timid habits. The march of their columns is made with much regularity. I have often taken the species, No. 39, at evening in my habitation, which they entered in small numbers, but whence they withdrew with haste when the lights were produced. The size of the individuals only, can serve to establish a distinction between the great and little workers, for the head and the mandibles do not present any remarkable difference.

HACIENDA DE POTRERO, 21st February, 1868.

REMARKS BY EDWARD NORTON.

The species of *Eciton* forwarded by Prof. Sumichrast may be temporarily classified as follows. (One species, No. 5, is not mentioned by him in the present paper.)

A. Metathorax more or less spinose.

1. Three classes of workers. Worker major with long mandibles.

No. 68. **Eciton hamata,** Fabr.

All classes have the head white and shining and the remainder of the body whitish-ferruginous. The antennæ are subfiliform.

This is abundant in Panama and Brazil.

No. 36. **Eciton mexicana,** Guér.

In the major and intermediate workers, the color of the head is pale brown, the thorax ferruginous and the abdomen nearly black. In the minor workers the head and whole body are black, with ferruginous tints. This closely resembles the *E. hamata,* but differs as follows: The antennæ are longer and the joints of the flagellum longer and more slender. The mandibles of second and third workers are in *hamata* aciculate longitudinally and toothed on the inner edge; in *mexicana* not aciculate longitudinally and with the biting edge smooth. The spines or angles at the back of the head of *hamata* are acute and curved outwardly. In this they are not acute. The spinose points on the metathorax of *hamata* are the termination of rather prolonged side carinæ. In this the carinæ are shorter and less prominent. In *hamata* the first node is one-half longer than wide; in this it is nearly as wide as long.

2. Two classes of workers, none with long mandibles yet taken.

No. 5. **Eciton rapax,** Smith. = *brunnea,* Norton, Am. Nat. II, 1868, p. 62. Proc. Essex Inst.

The antennæ are intermediate between No. 68. and 36, the mandibles coriaceous above, with their biting edge irregularly toothed and a large tooth towards the apex. The spines at the back of head are like those of *hamata*, of the metathorax longer. The color of the head and thorax blackish-brown, of the abdomen a clear brown.

This is found also in Brazil.

No. 39. **Eciton crassicornis,** Smith.

The color of this is a dull, dark reddish-brown, abdomen shining. Antennæ short, thickened, scape clavate, all the joints of the flagellum short, from middle to apex wider than long, paler beneath.

This is found in Brazil.

B. Metathorax unarmed with spinose processes.

a. Back of head widely emarginate, with acute angles.

No. 40. **Eciton Sumichrasti,** Norton, Am. Nat. II, 1868, 62. Proc. Essex Inst.

This is remarkable in having the back of head nearly as wide as the middle, the head, thorax and nodes very rugose and the abdomen polished. But one size of workers yet examined.

b. Back of head slightly emarginate, without spines or angulate corners.

No. 4. **Eciton tepeguas**, n. sp. Species nigra.

Worker major.—Length 0.40 inch. Deep black, shining, the flagellum, sides and apex of metathorax and legs below knees, ferruginous; antennæ as usual. Head large, slightly emarginate behind, not angulate, but somewhat rounded, and lobed at sides; mandibles rugose, running into longitudinal striæ, the inner edge with two large inner teeth, and with small pits along the inner edge. Antennæ inserted as in *E. legionis*, viz., the margin of a cavity raised about each at the front and sides and a deep channel down the middle of face. Eyes very small. Head and whole body shining, delicately reticulate and with larger scattered subobsolete pits. Parts of thorax distinct, with no acute angles. First node longer than second, compressed, second nobe widest, globose, both truncate behind, with no spine beneath, but a short tooth extending forward from apex of second. Abdomen covered with fine short pale hair, the whole body with longer reddish hair; edge of each segment of abdomen golden. The tips of hinder femora as long as the apex of abdomen.

No. 69. **Eciton tepeguas**. Var. **ferruginea**.

Worker major.—Color almost wholly ferruginous, abdomen blackish, surface dull, only the abdomen shining.

Probably a variety of No. 4.

No. 52. **Eciton clavicornis**, n. sp.

Only the *Worker minor*. Length 0.18 inch. Polished and shining. Color piceous-black, the flagellum and legs below the knees pale brown. Antennæ short, as in E. *crassicornis*, the scape hardly clavate, the flagellum quite so, apex of scape and the flagellum, nasus and mandibles yellow-red. Mandibles with longitudinal striæ arising from little punctures along the inner edge. Cutting edge falcate, smooth. Basin of antennæ large and deep. Eyes minute. Head emarginate behind, the angles distinct, not acute (about 90 degrees.) Nodes nearly equal; the first with a long spine at base beneath curving backward, the second with a tooth extending forward. Apex of metathorax and nodes beneath rufous, legs rather short, below the tips of knees yellow-rufous. Claws slender, their inner tooth small, near the base.

This is much like *E. simillima* Smith, but differs in form of metathorax, &c.

No. 77 appears to be a species of *Myrmica*.